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Multi-stakeholder dialogue on sustainable forest management

Note by the Secretary-General

Addendum

Discussion paper contributed by the scientific and technological communities working on forest-related fields**

Summary

The International Union of Forest Research Organizations (IUFRO) wishes to place its collective expertise and experience at the disposal of the United Nations Forum on Forests. IUFRO emphasizes research results and activities through its Structure, Task Forces, Special Programmes and Projects which could make significant contributions to realizing the objectives as well as fostering the issues that will be under consideration at the second session of the Forum.

Scientific contributions include: state-of-knowledge reports; case studies on reducing forest degradation and combating deforestation through selective harvesting systems for native forests and on the rehabilitation of degraded forest lands; and promotion of the holistic approach to forest matters undertaken by interdisciplinary Task Forces, especially for the transfer of knowledge from the scientific to the public domain.

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In the present paper, rehabilitation strategies for countries with low forest cover as well as strategies for the rehabilitation and restoration of degraded lands are analysed and possible solutions are presented.

Two international conventions, the Convention on Biological Diversity and the Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention), have made progress towards the conservation and protection of forests. An interim working group from G-8 as well as other countries, and IUFRO scientists, could draft initial protocols required for an international instrument to protect unique forests and fragile ecosystems.

The various elements discussed in this paper identify the need for greater financial input as well as stronger governmental support. The conclusions help to present a fair and realistic scenario which also emphasizes the considerable progress already achieved.

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Introduction

1. The International Union of Forest Research Organizations (IUFRO)[1] is a non-profit, non-governmental and non-political scientific body founded in 1892. IUFRO promotes international cooperation and coordination of scientific studies embracing the whole field of research related to forests and trees in support of science-based sustainable management of the world's forest resources for economic, environmental and social benefits. IUFRO has a strong and coordinated presence all over the world that unites more than 15,000 cooperating member scientists in about 700 member institutions in over 110 countries.

2. Our objectives are attained through:

- Promoting and facilitating an international dialogue on forest science and the role of forests in human welfare;
- Collecting and disseminating scientific knowledge on forest ecosystems, their products and services;
- Enhancing cooperation between forest research organizations and individual scientists by means of a global network;
- Promoting the dissemination and application of relevant research results and expertise using publications, recommendations, information technologies, training courses, workshops, conferences and congresses;
- Providing and promoting science input into policy-making;
- Compiling state-of-knowledge reports;
- Harmonizing research terminology and techniques;
- Addressing issues of regional and global significance with inter-agency or interdisciplinary actions.

3. The partners of IUFRO, some of which are also IUFRO members, include a number of international and national agencies and scientific organizations, inter alia, the Food and Agriculture Organization of the United Nations (FAO), the Centre for International Forestry Research (CIFOR), the International Centre for Research in Agroforestry (ICRAF), the United Nations University (UNU), the Tropical Agriculture Research and Higher Education Centre (Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)), the European Forest Institute (EFI), the World Conservation Monitoring Centre (WCMC) and the International Council of Scientific Unions (ICSU).

4. The work of IUFRO is carried out in 270 international Working Parties and Research Groups within 8 major Divisions,[2] by Task Forces,[3] and through Special Programmes and Projects.[4]

5. The most important event of IUFRO is the quinquennial IUFRO Congress, with an average of 3,000 participants. In the inter-Congress period, an average of more than 70 conferences, workshops and similar events are organized annually.

6. The collective expertise and experience of IUFRO member organizations, and the activities of its Divisions, Task Forces and Special Programmes and Projects represent a significant resource for the United Nations Forum on Forests and the Collaborative Partnership on Forests. IUFRO welcomes the opportunity to

contribute to the deliberations of these bodies and to continue playing an important role in the implementation of Intergovernmental Panel on Forests/Intergovernmental Forum on Forests (IPF/IFF) decisions and proposals for action at the national, regional and global levels.

7. In the present paper,[5] we highlight some of the IUFRO activities, perspectives, and experiences related to the specific issues under consideration at the second session of the United Nations Forum on Forests, emphasizing those areas in which IUFRO can and does play a significant role in realizing the objectives of combating deforestation and forest degradation, and promoting forest conservation and protection of unique forest types and fragile ecosystems, the development of rehabilitation and conservation strategies for countries with low forest cover, and the rehabilitation/restoration of degraded lands and promotion of natural and planted forests.

8. We would point out that IUFRO has taken action on many of the recommendations made in IPF and IFF reports. For example, it has encouraged the development of a holistic approach to forest matters (see the report of IFF on its fourth session (E/CN.17/2000/14), sect. II, annex, para. 130) through the creation of a number of interdisciplinary Task Forces investigating issues of particular concern to IPF and IFF. IUFRO will continue to respond to the needs of the international forestry community and is committed to bringing the best available science to any discussions of forest policy.

I. Combating deforestation and forest degradation

A. Background

9. It is disappointing that IFF noted (see E/CN.17/2000/14, sect. II, annex, para. 57) the continuing relevance and validity of the IPF proposals for action in combating deforestation and forest degradation, since this suggests that the IPF proposals were insufficient, or were not acted upon in an appropriate fashion. In the latter case, a major factor has been the difficulties associated with the funding of activities that would result in the implementation of the proposals. While significant progress has been made by CIFOR, IUFRO and others in defining sustainable forest management and identifying the criteria and indicators of sustainable forest management, implementation at the scale of the management unit remains difficult.

B. Current IUFRO activities

10. The IUFRO international network of member organizations and scientists in its Divisional units and Task Forces are actively engaged in a wide range of research and development activities aimed at the sustainable management of natural and plantation forests in most of the world's major tropical, temperate and boreal forest biomes. Through our activities we provide a solid scientific basis for dealing with many of the challenges facing the United Nations Forum on Forests, the Collaborative Partnership on Forests, and countries, including:

- Improved methods for inventory and monitoring of forest resources;
- Development of criteria and indicators for sustainable forest management;

- Refinement and evaluation of operational methods for forest management, including reduced-impact logging in tropical forests;
- Better understanding of the relationships between forest management practices and the flow of environmental and socio-economic goods and services that forests provide;
- Analysis of the implications of global change on forest health and biodiversity conservation;
- Development of new, effective strategies for combating deforestation and forest degradation through improved productivity of managed forests, plantations, agroforestry systems, silvicultural techniques for effective reforestation and restoration of degraded forest landscapes (see box 1).

In addition, state-of-the-art reports have been published on *Forests in Sustainable Mountain Development*[6] (2000) and *Criteria and Indicators for Sustainable Forest Management*[7] (2001).

C. Air pollution impacts

11. The impact of airborne pollution on forests was recognized in paragraphs 47-49 of the report of IPF on its fourth session (E/CN.17/1997/12). Countries were encouraged to strengthen international cooperation for building scientific knowledge (para. 50 (b)) about the airborne causes of deforestation and forest degradation. The IUFRO Task Force on Environmental Change has addressed this issue, publishing a series of state-of-the-art reports on air pollution impacts and environmental change in general. To date, these include *Forest Dynamics in Heavily Polluted Regions*[8] (1999), *Air Pollution and the Forests of Developing and Rapidly Industrializing Countries*[9] (2000) and *The Impact of Carbon Dioxide and Other Greenhouse Gases on Forest Ecosystems*[10] (2001). A report dealing with geohazards such as floods and landslides in forested areas associated with environmental change is in press, and further volumes in this series are well under way. In addition to these reports, there have been a number of other activities by IUFRO Research Groups dealing with air pollution impacts on forests.

D. Certification

12. One mechanism to help reduce forest degradation and improve the standards of forest management in general is forest management certification. The pattern of a proliferation of schemes referred to in paragraph 34 of the annex to section II of the report of IFF on its fourth session (E/CN.17/2000/14) appears to have been reversed, and there has been consolidation among a limited number of schemes (for example, that of the International Organization for Standardization (ISO), the Pan-European Forest Certification scheme, the Forest Stewardship Council, and the American Forest and Paper Association Sustainable Forestry Initiative). The different schemes are under pressure to develop systems of mutual recognition that will help achieve their international comparability and help determine their equivalency while taking into account the diversity of national and regional situations. Scientists from IUFRO member institutions have been extremely active in the national and international

certification schemes, helping develop standards and taking part in audits of forest management.

Box 1

Case study: reducing forest degradation through the selective harvesting systems for native forests

Using a somewhat simplified classification, rotation forest management (RFM) systems can be distinguished from continuous cover forestry (CCF) systems. Intensive RFM using standard silvicultural practices is found in the southern hemisphere (Chile, South Africa, Australia, New Zealand), in the south-eastern United States, in many parts of Asia and in the Mediterranean region. CCF systems are characterized by selective removals and are most frequently found in the deciduous and temperate rainforest biomes and in densely populated industrialized countries. Considerable forest areas are currently being converted from RFM to CCF management and numerous examples show that CCF systems can be successfully employed in a great variety of natural/native forests. It appears that the deciduous and temperate rainforest biomes of East Asia, Europe, the Americas and Australia are generally suitable for this kind of management.

Spirited debates continue in the environmental literature between **preservationists** who claim that a habitat must be preserved in its natural state and **conservationists** who argue in favour of a compromise — for management options in which the essential features of the natural habitat are maintained but the resource itself is harvested for commercial purposes. Successful implementation of a CCF management system requires operational objectives and a practical management concept that involves suitable methods of resource assessment, orientation and control. Sound solutions must be developed for specific conversion problems. Forest development is inherently uncertain and management needs to be adaptive. Adaptive management is facilitated by regular quantitative analysis of modifications of forest structure caused by selective harvesting. An important element of a CCF management system is a network of permanently maintained management demonstration areas providing orientation to field staff and essential data that are required for developing growth models and constrained optimization models. CCF systems are also attractive for public forest administrations in regions where environmental issues and habitat conservation are politically important.

E. Future trends

13. While the IPF/IFF proposals for action address a very broad range of issues within the forest sector, their recognition of the cross-sectoral issues that drive much of the deforestation and forest degradation that we see today in many parts of the world is more limited. As indicated in paragraph 9 (b) of the annex to section II of

the report of IFF on its fourth session (E/CN.17/2000/14), an integrated approach is required for national forest programmes. There is a clear need to recognize the relationships between forests and agriculture, not only because agricultural expansion is the main driver of deforestation in many/most countries, but also because there are beneficial linkages between forests and agricultural productivity (for example, soil conservation, and stabilization of hydrology). These links are being explored through IUFRO Research Group 1.15.00 (Agroforestry). Forest-water issues in general are likely to increase in prominence, and IUFRO has established a task force to prepare state-of-the-art reports on this subject.

F. An identified need

14. IFF also recognized the need (E/CN.17/2000/14, sect. II, annex, paras. 43-56) to encourage the transfer of environmentally sound technologies to support sustainable forest management. This would go a long way towards resolving many of the issues associated with deforestation and forest degradation. However, for scientists in many IUFRO member institutions, there are no clear incentives to undertake technology transfer. Indeed, in many institutions, the pressures to undertake high-quality research are such that technology transfer is discouraged. The United Nations Forum on Forests could help resolve this problem by further recommending to national Governments that sufficient and appropriate funds be allocated to technology transfer and that scientists in research institutions and universities be encouraged to take part in this activity. It could also further encourage international organizations, donor countries and financial institutions to better coordinate funds for scientific research with the needs identified by IPF, IFF and the United Nations Forum on Forests.

II. Forest conservation and protection of unique types of forests and fragile ecosystems

A. Background

15. The current situation concerning forest conservation is summarized in paragraph 40 of the note by the Secretariat on matters left pending and other issues arising from programme element II.d (i) of the IPF process: underlying causes of deforestation; traditional forest-related knowledge; forest conservation and protected areas; and research priorities (E/CN.17/IFF/1998/10), which states: "The present situation calls for urgent and consistent action for forest conservation and conservation in protected areas. Areas should be selected and managed so that maximum biological diversity is preserved." the report of the Secretary-General on matters left pending and other issues arising from programme element II.d (iii) of the IPF process: issues that need further classification: forest conservation and protected areas (E/CN.17/IFF/1999/10) (para. 45 (h)) urged international bodies (particularly the United Nations Environment Programme (UNEP), CIFOR and the World Conservation Union (IUCN)) "to establish criteria that identify and help select sites critical to the protection and maintenance of ecosystem services". The identification of high conservation value forests is being undertaken as part of a larger framework that identifies geographical regions of high conservation priority, including, for example, the Biodiversity Hotspots, the Global 200 Initiative and the

Frontier Forests Initiative of the World Resources Institute (WRI). This work is most advanced for birds, primarily through the work of BirdLife International (specifically the studies published as *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*[11] and *Threatened Birds of the World*[12]). These studies build on earlier work by the International Council for Bird Preservation (for example, *Key Forests for Threatened Birds in Africa*[13]). However, while forests of conservation value are being identified, no progress has been made on the development of international mechanisms that are specifically targeted at the protection of unique types of forests. IPF (E/CN.17/1997/12, paras. 41-46) recognized the need to examine fragile ecosystems affected by desertification and drought, and to protect forests in countries with low forest cover (para. 58 (b)). Under paragraph 46 (c) of document E/CN.17/1997/12, the Panel urged countries to establish protected areas to safeguard forests and related ecosystems.

16. At the moment, there is some uncertainty over terminology. This has been exploited by some groups, causing confusion. Terms such as "old-growth forests", "ancient forests", "endangered forests", "frontier forests", "intact forests" and "forests of high conservation value" need to be used with a great deal more care than has been the case. The IUFRO SilvaVoc terminology project has considerable potential to provide definitions, but the provision of suitable definitions will not necessarily avoid the misuse of terms, particularly in marketing campaigns aimed at consumers. The SilvaVoc Project on Multilingual Forest Terminology functions as a clearing house for terminological issues in forestry, with a multilingual term database, international online bibliography on forest terminologies, glossaries and related publications and an information platform on IUFRO and other terminological projects in forestry. Subject-specific terminology work was performed in cooperation with the IUFRO Structure, on forest management, low forest cover, with Working Party 6.03.02, on discussion lists on specific terms (reforestation, afforestation, deforestation, old-growth forests, forest health etc.) and with FAO, on forest resources assessment and forest genetic resources.

B. National developments

17. Virtually every country today has a system of protected areas, demonstrating the commitment of Governments to conservation. These are developed on a national basis although, on occasion, there may be bilateral arrangements between countries for reserves extending across national boundaries. It is significant that the long-term protection of representative and unique forests is recognized as an integral part of sustainable forest management (SFM). As stated in document E/CN.17/IFF/1999/10 (summary), all eight regional processes on the formulation of criteria and indicators for SFM, involving more than 100 countries, include the establishment of protected forest areas as one of the basic criteria. Provision of protected areas is also included in some forest management certification schemes, such as that of the Forest Stewardship Council. While this represents important progress towards the protection of unique forests and fragile ecosystems, it is important to note that the above report went on to state that "the current extent and types of protected areas, particularly in densely populated regions, are deemed insufficient to achieve sustainable forest management". In particular, many systems of protected areas fail to meet the criteria of adequacy, connectivity and effectiveness. Further progress is still required to develop appropriate networks of protected areas that provide an

unbiased and complete coverage of a range of representative forest ecosystems, and that ensure the enforcement of the protection of designated protected forest areas (E/CN.17/IFF/1999/10). Support from international organizations and mechanisms would help individual Governments achieve this aim and has the potential to play a crucial role.

C. International developments

18. Two international conventions have in recent years made some progress towards the conservation and protection of forests. They are the Convention on Biological Diversity[14] and the Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention)[15]. The original text of the Convention on Biological Diversity does not specifically highlight the importance of forests as the most important depository of biodiversity. However, the parties to the Convention on Biological Diversity have acknowledged the importance of forests to the conservation of biodiversity (see the Conference of the Parties to the Convention on Biological Diversity at its first meeting, decision I/8, annex, para. 15). The World Heritage Convention entered into force in 1972, almost two decades before the Convention on Biological Diversity. Its inception was the result of concerns over the destruction of cultural and natural heritage of world significance. As with the Convention on Biological Diversity, it is not restricted to forests. Since its inception, 690 sites in 122 countries have been accorded world heritage status, of which 138 are sites of natural heritage. Of these 138 natural heritage sites, 33 are tropical closed forests of high conservation value. These tropical forest sites span five tropical forest types (mangrove, montane rainforest, lowland rainforest, sub-montane rainforest and lowland monsoon and dry forest) and cover a total area of 24.7 million hectares, approximately 2.35 per cent of the world's existing forest cover.

19. The feasibility of either Convention's incorporating adequately the protection of endangered forests is dependent on two primary factors. Firstly, the Convention's allowance for amendments must be such that the protection of forests can be specifically covered. This is possible with both the Convention on Biological Diversity and the World Heritage Convention (see article 29 of Convention on Biological Diversity and article 37 of the World Heritage Convention). The process of amendment is difficult, however. More importantly, even if the Conventions are successfully amended to incorporate the protection of endangered forests, there is no guarantee that all parties will accept the amendment, and each Convention allows for parties to withdraw from the Convention. The effectiveness of any Convention that will oblige countries to protect endangered forests is highly dependent on the number of countries that have ratified the Convention. As regards the Convention on Biological Diversity and the World Heritage Convention, a large number of countries in the world have ratified both Conventions,[16] with the notable exception of the United States of America, which has ratified only the World Heritage Convention. Although the United States is not especially rich in biodiversity, its participation in any international environmental accord is important since it is the world's leading economic and social power. Furthermore, the United States has one of the world's best-developed systems of wildlife preservation and this expertise could significantly improve the standards of inventories and monitoring. Between the Convention on Biological Diversity and the World Heritage Convention, it

would therefore seem that the World Heritage Convention would be able to better accommodate any proposed amendments and protocols on the protection of endangered forests.

D. Possible action

20. An interim working group comprising government representatives from the G-8 countries and countries that have substantial amounts of high conservation value forests and supported by science through IUFRO and its partners could meet to draft the initial protocols required for an international instrument to protect unique forests and fragile ecosystems. The latter group of countries could consist of countries listed by the World Resources Institute as having some amounts of frontier forests (large tracts of relatively undisturbed forests) remaining. Rather than the development of a new instrument, there could then be an incorporation of these protocols into the World Heritage Convention as an amendment in accordance to article 37 of the Convention. The rationale for such a working group is that the protection of high conservation forests can be achieved at the international level only through the commitments of the world's economic powers and the willingness of countries with substantial amounts of forests left to undertake conservation actions. Recalling the conclusions of IFF (E/CN.17/2000/14, sect. II, annex, paras. 30-31), the world's economic powers should provide an appropriate financing mechanism if the protection of high conservation forests is to be realized in less developed countries (which is also where most the most endangered forests are found today). Any protocol would need to ensure the effectiveness of the designation, usually considered in relation to degree of protection of ecological diversity, institutional capacity, positive social impacts and secure legal status.

III. Rehabilitation and conservation strategies for countries with low forest cover

A. Background

21. IFF recognized that there are both developed and developing countries with low forest cover, and identified countries of low forest cover (LFC) as being of special concern. One problem that has surfaced is to determine which are the countries with low forest cover. Since a definition of "low forest cover" was not available, it called on the United Nations Environment Programme (UNEP), as lead agency for this programme element, to expedite the development of a definition of "low forest cover" as contained in the IPF proposals for action. IUFRO signed a Memorandum of Understanding with UNEP in 1998 for the development of a workable and precise definition of "low forest cover" in agreement with FAO. IUFRO Research Group 4.02 on "Forest Resource Inventory and Monitoring" subsequently prepared a report,[17,18] on countries with low forest cover containing: a workable and precise definition of the term "low forest cover", applicable to all countries and suited for use in the forest resources assessment in the year 2000, a list of countries with low forest cover, based on the definition, and option/ways for improving the productivity, conservation and monitoring of countries with low forest cover, taking into account the social and cultural dimensions. IUFRO identified four different options — the ratio of forest cover to total land area, the

ratio of current forest area per capita, the ratio of current forest area to historic area and a combination thereof — as the most popular. An eigenvalue analysis indicates that the classifications of countries based upon a combination of variables (area of forest and other wooded lands, original forest land, and population) is a good first attempt.

B. Current situation

22. Low forest cover can arise as a result of natural ecological conditions, as well as of human activities, and the situation is constantly changing. Some countries are actively expanding their forest cover, while others are approaching qualification for entry into the low forest cover category. The restricted area of forests in countries with low forest cover results in reduced capacity for the production of timber and for the provision of goods and services, including the protection of watersheds, the supply of fuelwood, the maintenance of biological diversity and endemic species, and recreation and amenity. Moreover, many of the forest types in those countries are distinctive or even rare, and require national protective measures and international support, while the proportion included in nationally designated protected areas is often below average.

23. The definition of "forest" varies from country to country.[19] An international definition is needed so country-to-country comparisons can be made. Before we can finalize a definition of "low forest cover" we need to have a better understanding of how the information will be used. However, it is safe to say that it is important that we know the following about each country — total forest and land areas, total population, and total "original" forest area. Such estimates are available from the World Conservation Monitoring Centre as well as from the World Resources Institute. Basing a working definition of low forest cover on combinations of indicators is attractive in that this possibly allows for a "richer" interpretation of the difficulties to emerge in the political discussion that the United Nations Forum on Forests will hold. Any composite index should reflect the nominal error levels and allow sensitivities to guide categorization. We should emphasize obtaining good basic data on areas and populations before trying to derive simplistic indices.

24. If development agencies are forced to choose only one option, they should be aware that a population-based ratio is the most informative indicator for use in making resource allocation determinations. The dominant historical relationship between people and forests has been one where, as the former advances, the latter retreats. If, as the saying goes, the past is prologue, then population dynamics will remain a key factor — though certainly not the only factor — demanding consideration by all parties interested in achieving "sustainable" resource management.

C. Outstanding needs

25. Rehabilitation of degraded landscapes in countries with low forest cover is an emerging priority. However, there is a need for better understanding of what we hope to accomplish through this effort. Among the questions that need to be addressed are the following:

- Is it desirable that all countries be equal in their ability to produce forests? Inherent differences in climate, soils, topography and other biophysical factors influencing natural forest distribution and potential forest productivity will preclude this possibility: it is unrealistic to expect Egypt, for example, to have the same percentage of forest area as Canada;
- Will being classed as a low forest cover country be an incentive or a disincentive to increase forest area? Is it possible that some countries would try to reduce their forest area or underreport forest area in order to qualify as a low forest cover nation? What is the incentive for a nation to increase its forest land so that it no longer qualifies as a low forest cover country?
- Expanding forest cover in most low forest cover countries will probably require plantations. Are plantations acceptable to relevant stakeholders, and will they yield the expected economic, social and/or environmental benefits to balance reforestation or afforestation investments and possible opportunity costs associated with other land-use options?

IV. Rehabilitation and restoration of degraded lands, and promotion of natural and planted forests

A. Background

26. Experience has shown that successful rehabilitation and/or restoration of degraded forest landscapes require an understanding of the local socio-economic and ecological context, including both the underlying and the direct causes of forest degradation and loss (E/CN.17/2000/14, sect. II, annex, para. 123). Also necessary is an understanding of landscape conditions within and around sites targeted for forest rehabilitation or restoration, specifically local land-use and land-tenure patterns, the location and ecological condition of natural forest ecosystems (if present in the landscape), vegetative composition and degree of soil degradation, and ongoing degradation agents (for example, fire, wind or water erosion, and grazing). This information is critical for identifying the natural and anthropogenic barriers to natural forest ecosystem recovery that must be overcome, and defines the range of realistic possibilities and likely outcomes of rehabilitation efforts. Depending on the local or regional context, forest landscape rehabilitation and/or restoration goals and objectives are likely to be diverse: improvement of agricultural productivity, increased hydrologic stability within upland watersheds (decreased incidence of flooding and maintenance of adequate base flows during dry seasons), reduction of soil erosion, increased production of fuelwood, small timber, and fodder, sustainable productivity of non-wood forest products, and/or maintenance or expansion of diverse wildlife habitats within or surrounding protected areas.

B. Current situation

27. A large proportion of marginal, degraded lands can and should be rehabilitated primarily for food production or other important societal needs. New cropping practices (including agroforestry technologies) and more efficient agricultural resource management systems can assist this process and ensure that agriculture remains sustainable and, in the process, lessens local pressures on natural forest

ecosystems. There remain, however, significant formerly forested areas in many countries that cannot be economically rehabilitated in the near term for sustainable agricultural production, and degraded lands of high potential value for conservation and watershed protection.

28. An unknown proportion of these lands would naturally revert fairly quickly to secondary forest if the pressures on them (that is to say, biomass harvesting, grazing, fire) were lifted. Other, more severely degraded landscapes require some form of human intervention, or management, to facilitate their recovery owing to the persistent physical, chemical and biological barriers, or stresses, that preclude or severely limit the rate of natural forest succession.

29. Planted forests, using appropriate tree and shrub species, can play an important role in harmonizing forest landscape rehabilitation or restoration and socio-economic development goals. Plantations of fast-growing native and exotic trees are playing an increasingly significant role in landscape management and the rural economy in many regions (see box 2). Such plantations provide timber and fibre for industrial development and, in some cases, fuel, small timber, and non-wood forest products for local communities, and are used increasingly for rehabilitating deforested watersheds and other degraded landscapes, particularly in the Asia-Pacific region.

Box 2

Restoring degraded tropical forest landscapes: harmonizing production and biodiversity conservation goals

Numerous studies carried out in tropical countries during the past 15 years have demonstrated that plantations (of both native and exotic tree species) can accelerate, or catalyse, forest succession in their understoreys on degraded sites where persistent ecological barriers to succession would otherwise prelude recolonization by native forest species.[a] This commonly occurs owing to their influence on understorey microclimatic conditions, vegetation structural complexity, and development of litter and humus layers during the early years of plantation growth. These changes lead in turn to increased seed inputs from neighbouring native forests by seed-dispersing wildlife attracted to the plantations, and suppression of grasses or other light-demanding species that normally prevent tree establishment. In the absence of silvicultural management aimed at eliminating woody understorey regeneration, even monospecific plantations are replaced by mixed forests comprising the planted species and an increasing number of early and late successional tree species and other floristic elements drawn from surrounding forest areas. These findings demonstrate that diverse long-range forest restoration goals can be attained using appropriately managed plantation systems established for more immediate production purposes.

[a] The results of a recent international research project on this topic, funded by the World Bank, the United States Department of Agriculture Forest Service, CIFOR and official development assistance, were evaluated in a IUFRO workshop in 1996 (see J. A. Parrotta and J. W. Turnbull, eds., "Catalyzing native forest regeneration on degraded tropical lands", *Forest Ecology and Management*, vol. 99 (1997), pp. 1-290.

C. Possible solutions

30. In complex rural settings, large-scale landscape rehabilitation/restoration efforts involving tree planting will likely call for a diversity of approaches suited to particular stakeholder objectives and appropriate to specific biophysical site conditions. These may include:

- Agroforestry systems combining tree crops for timber, fuelwood, fodder production and soil amelioration, with cultivation of food crops, high-value species such as medicinal plants and/or fodder;
- Intensively managed single- or mixed-species plantations primarily for timber or fuel production;
- Lightly managed plantings involving appropriate native and/or exotic tree species intended to "catalyse" natural forest succession and ecosystem restoration primarily for environmental benefits (soil conservation, watershed stabilization, biodiversity conservation) while offering multiple socio-economic benefits in the longer term, including the provision of wood and non-wood forest products.

31. For each of these (or additional) options, a guiding principle for reforestation design and management is to "work with nature" to the greatest extent possible so as to meet specific rehabilitation or restoration goals at minimum cost. In this context, working with nature means targeting management interventions to overcome the major biophysical barriers to forest ecosystem recovery and relying on natural processes to continue this task. Risks can be minimized by adopting an adaptive management approach in which management decisions are modified as needed based on the results of periodic monitoring and assessment.

32. Given the diverse needs of families, communities and society for forest products traditionally extracted from (shrinking) natural forest areas, and the importance of species selection for the long-term ecological effects of plantations, greater emphasis needs to be given in most countries to the utilization of a broader range of native forest species than are currently used in plantation development and rehabilitation programmes. Most countries with a long tradition of forestry research are fortunate in that the silvicultural knowledge of their more common native tree species is well studied and documented. This knowledge, as well as that related to improved nursery production, site preparation, soil amelioration, and planting practices developed in recent years, needs to more widely communicated and used by those engaged in forest rehabilitation and restoration projects.

33. "Restoration forestry" as an approach to rehabilitation of degraded landscapes has the potential to increase productivity of rural landscapes while restoring ecosystem functions for multiple environmental benefits such as improved watershed stability, soil conservation, and biodiversity conservation. The synthesis and application of existing knowledge can offer viable and sustainable forestry-based alternatives in countries facing progressive degradation of their forest, soil and water resources. To be effective, landscape rehabilitation and restoration forestry solutions must be designed and managed to fit local ecological conditions and, perhaps more importantly, meet the short- and long-term needs and goals of local communities and other stakeholders who presently deal with the negative consequences of deforestation and land degradation.

34. With well-defined objectives, political will, broad stakeholder participation and adequate financial and technical support, countries can make significant progress in reversing forest loss and furthering sustainable development goals, including the quantity and quality of the economic and environmental goods and services that forests provide. This has been demonstrated in a number of countries in recent years, as illustrated in the case study of the Republic of Korea, presented below in box 3.

Box 3

Case study: the rehabilitation of degraded forest lands in the Republic of Korea

In the nineteenth century, the Republic of Korea was rich in old-growth forests. However, these forests were lost or severely degraded by over-cutting and illegal cutting for construction and fuelwood during the Japanese occupation (1910-1945) and the Korean War (1950-1953). As a result, the average forest growing stock decreased from about 100 cubic metres per hectare in the early 1900s to 10.6 cubic metres per hectare in 1960.[a] This grave situation led to the implementation by the Republic of Korea of a series of 10-year plans at the national level to promote the re-establishment of forest resources and to encourage local governments to set up their own forest plans on the basis of these National Forest Development Plans (FDPs). Reforestation activities carried out during the last 40 years have rehabilitated more than 4.5 million hectares (or about 97.4 per cent of the country's previously deforested areas). Since the late 1960s, approximately 12 billion trees have been planted with several fast-growing trees; today, plantations are estimated to cover 70 per cent of the total forest land area. As a result of these activities, the growing stock in the forests of the Republic of Korea has increased dramatically to 60.3 cubic metres per hectare, with average annual growth rates of 2 cubic metres per hectare.

The First FDP (1973-1978), which focused on reforestation of denuded forest lands, was a turning point in forestry of the Republic of Korea. The First Plan involved: (a) implementing the national tree planting movement through the participation of all people in various reforestation projects; (b) developing new economic forest zones for land conservation and income enlargement by reforestation and forest production; and (c) achieving rapid reforestation of denuded forest lands through planting of fast-growing tree species. It also included measures to ensure forest protection by restricting access to mountain forests and developing fuelwood forests to meet the domestic energy needs of rural people. Through the implementation of the national reforestation movement, the reforestation target of 1 million hectares, originally planned to have been reached in 1982, was accomplished in 1978, after only six years.

The Second FDP (1979-1987) aimed to build large-scale commercial forest zones in order to develop long-term timber resources. The Korean Forest Service (KFS) initiated forest policies to: (a) strengthen the national reforestation plan; (b) intensify forest

protection activities; (c) enlarge forest development funds to support private forest management; (d) group and expand the national forests; and (e) conduct forest conservation projects to improve the public benefits of forests. During this period, KFS established 80 large-scale commercial forest zones; reforested 325,000 hectares in these zones, conducted continuous tending activities in natural forests and watershed forests, and undertook erosion control works on denuded forest areas on a regional basis.

The Third 10-Year FDP (1988-1997), building on the accomplishments of the earlier Plans, was designed to harmonize goals of increasing the economic value of forests and improving public benefits from forests by improving forest land-use efficiency. The Plan focused on the rational use of forest land, creation of superior timber resources, forest management infrastructure development, improvement of forest products distribution networks, and improvements in people's living environments. During this period, KFS established commercial forest zones of 320,000 hectares, conducted silvicultural activities in over 3 million hectares, constructed forest roads, trained forest technicians and expanded the distribution channels for forest products.

Through the Fourth FDP (1998-2007), KFS will complete the Government-led reforestation programme and move to a forest management programme based on self-regulation and promotion. To meet diverse societal demands from forests and recent international forest policy objectives, the primary aim of the Fourth Plan is to establish and develop sustainable forest management. In addition, KFS will work to develop valuable forest resources, foster a competitive forest industry, and promote a healthy and pleasant forest environment.

[a] Korean Forest Service, *Green Korea, 2000* (2000).

V. Proposals to enrich discussions at the second session of the Forum, including inputs to the high-level ministerial segments

35. To date, very limited progress has been made towards the achievement of monitoring progress in implementation (see E/CN.17/2000/14, sect. II, annex, paras. 10-19). While there has been much discussion, the actual implementation of a cost-effective and appropriate system for the collection, reporting and dissemination of data on the implementation of the recommendations of IFF and IPF has not been achieved. The State of the World's Forests report of FAO, combined with the major achievement by the Forest Resources Assessment, 2000, represents significant progress. However, both of these reports do not address in detail the concerns of IPF and IFF. The provision of accurate and timely data could significantly enrich the discussions of the United Nations Forum on Forests, and priority should be given to ensuring that these data are available. IUFRO, through its Global Forest Information Service, could provide an important contribution in this area, especially if strong links could be established between it, international forest information services (for

example, the FAO Forest Resources Assessment and the Economic Commission for Europe Temperate and Boreal Forest Resource Assessment), national forest information services, and regional information services.

36. Information management is a key factor in the success of international discussion on forest-related issues. However, existing information schemes are heavily biased towards what has been termed "Western science". There is a need for the information management systems that are being developed to be able to incorporate alternative knowledge systems, particularly those related to traditional forest-related knowledge. To date, there are very few systems that have achieved this. Involvement of groups that have successfully involved indigenous peoples and local communities in knowledge-gathering and -sharing would be of enormous benefit to the development of appropriate information management systems. The development of such inclusive systems would also contribute greatly to the IFF goal of strengthening research to inform policy, solve practical national and forest-related environmental problems, and meet national priorities (E/CN.17/2000/14, sect. II, annex, paras. 91 and 98).

37. As globally coordinated forest research becomes a priority in the context of sustainable management and global change, the need for concerted action in forest terminology is obvious. Together, Working Party 6.03.02 and the SilvaVoc Project can significantly contribute to this collective effort by consolidating the network, resources and expertise they have built since 1996. Successful terminology work will also depend on an instrument that allows the harmonized definitions to be made available to the user. The SilvaTerm multilingual database can play this role.

38. At a time when national Governments are under increasing financial pressures, it is notable that, with a few exceptions, the recommendations of IFF (E/CN.17/2000/14, sect. II, annex, paras. 95 and 96) have had very little effect on research policies, programmes and strategies to strengthen forest research. Few countries have taken action on the recommendation to improve linkages between forest science and forest policy. There are major benefits to be gained in the development of networks of scientists (the BorNet group, for example, which examines the conservation of boreal forest biodiversity, is sponsored by the Canadian Sustainable Forest Management Network National Centre of Excellence and includes scientists, policy makers and forest industry representatives from Canada, Finland, Norway, the Russian Federation, Sweden, the United Kingdom of Great Britain and Northern Ireland, and the United States of America) and the networking of scientists with policy makers, practitioners and other forest stakeholders.

VI. Conclusions

39. The extent of research coordination in some forest-related areas has increased. This is evident in, for example, the work of the Intergovernmental Panel on Climate Change. It is also made evident by the Task Forces established by IUFRO, which are playing an increasingly important role in the transfer of knowledge from the scientific to the public domain. IUFRO is further facilitating this process through its series of workshops on the science policy interface, the first of which was held in Costa Rica in November 2001. Further workshops in this series are planned in India (2002) and Denmark (2003).

40. A number of countries have adopted mechanisms to foster forest research involving both the public and the private sector. However, no system has been developed to monitor these, and to report on their successes and failures. In a community that prides itself on its networking capabilities, this is a serious omission that needs to be rectified. The tentative steps being taken towards a global forest information system could help here.

41. The scientific community has made significant progress in some of the priority areas identified by IPF and IFF. However, there remain conflicts between the interests of individual scientists, protected under the rules of "academic freedom", and the needs of society. This is evident in the priority that many scientific funding agencies accord to "pure" research (as opposed to applied research), and the relatively low esteem in which many applied scientists are held by their peers. This is a problem of scientific culture that needs to be addressed if science is to make a greater contribution in respect of tackling many of the problems with which the Forum is faced.

42. IUFRO has played a major role in promoting forest research. This is evidenced by its pivotal role in the International Consultation on Research and Information Systems sponsored by Austria and Indonesia. This consultation identified a number of issues, such as research priority-setting, but it appears that little action has been taken to follow up the Consultation's recommendations.

Notes

[1] For more information see: http://www.iufro.boku.ac.at/.

[2] Silviculture (Division 1); Physiology and Genetics (Division 2); Forest Operations (Division 3); Inventory, Growth, Yield, Quantitative and Management Sciences (Division 4); Forest Products (Division 5); Social, Economic, Information and Policy Sciences (Division 6); Forest Health (Division 7); Forest Environment (Division 8).

[3] Environmental Change; Forests in Sustainable Mountain Development; Management and Conservation of Forest Gene Resources; Water and Forest; Global Forest Information Service; Science/Policy Interface; Public Relations in Forest Science; The Role of Forests in Carbon Cycles, Sequestration and Storage.

[4] SilvaVoc Terminology Project; World Forests, Society and Environment Research Project (WFSE); Special Programme for Developing Countries; Special Programme — Global Forest Information Service (GFIS).

[5] Compiled from material provided by Klaus von Gadow, John Innes, Don K. Lee, Gyde Lund, Alex Mosseler, John Parrotta, Renate Prueller, Heinrich Schmutzenhofer and Kazuo Suzuki.

[6] IUFRO Research Series, No. 5, M. Price and N. Butt, eds. (Wallingford, United Kingdom, CABI Publishing, 2000).

[7] IUFRO Research Series, No. 7, R. J. Raison and A. Brown (Wallingford, United Kingdom, CABI Publishing, 2001).

[8] IUFRO Research Series, No. 1, J. L. Innes and A. J. Oleksyn, eds. (Wallingford, United Kingdom, CABI Publishing, 1999).

[9] IUFRO Research Series, No. 4, J. L. Innes and Haron Abu Hassan, eds. (Wallingford, United Kingdom, CABI Publishing, 2000).

[10] IUFRO Research Series, No. 8, D. Karnosky and others (Wallingford, United Kingdom, CABI Publishing, 2001).

[11] A. J. Stattersfield and others, *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation* (Washington, D. C., Smithsonian Institution Press, 1997).

[12] A. J. Stattersfield and D. R. Capper, *Threatened Birds of the World* (Barcelona, Spain, and Rockville Center, New York, Lynx Editions, 2000).

[13] N. J. Collar and S. N. Stuart, *Key Forests for Threatened Birds in Africa*, International Council for Bird Preservation Monograph, No. 3 (Cambridge, United Kingdom, International Council for Bird Preservation, 1988).

[14] See United Nations Environment Programme, *Convention on Biological Diversity* (Environmental Law and Institution Programme Activity Centre), June 1992.

[15] United Nations, *Treaty Series*, vol. 1037, No. 15511.

[16] One hundred and sixty-one countries have ratified the World Heritage Convention, while 178 countries have ratified the Convention on Biological Diversity.

[17] H. Gyde Lund, *Definition of Low Forest Cover (LFC)* report prepared for IUFRO/UNEP (Manassas, Virginia, Forest Information Services, 2000).

[18] The IUFRO SilvaVoc project and Working Party 6.03.02 on "Trends in Forest Terminology" provided additional support to this effort by compiling information on existing definitions, and by setting up a short-term discussion to provide additional "food for thought". The input and discussions may be viewed at http://www.home.att.net/~gklund/LFCpaper.html.

[19] See http://www.home.att.net/~gklund/DEFpaper.htm.